

REMARKS

The Office Action dated November 13, 2006 has been received and carefully noted. The above amendments to the claims and the following remarks are submitted as a full and complete response thereto.

In accordance with the foregoing, claims 14 and 34 have been amended to improve clarity of the features recited therein. No new matter is being presented, and approval and entry are respectfully requested.

The Applicants wish to thank the Examiner for indicating allowable subject matter in claims 1-3, 6-13, 20-23, 26-33, and 40.

Claims 1-3, 6-17, 20-23, 26-37 and 40 are pending and under consideration.

REJECTION UNDER 35 U.S.C. § 103:

In the Office Action, at page 2, claims 14-17 and 34-37 were rejected under 35 U.S.C. § 103 as being anticipated by U. S. Patent No. 5,331,637 to Francis et al. ("Francis") in view of U. S. Patent No. 6,795,433 to Li ("Li"). It is respectfully asserted that, for at least the reasons provided herein below, Francis and Li fail to teach or suggest the recitations of the pending claims. Reconsideration is requested.

Independent claim 14, upon which claims 15-17 are dependent, recites a method for forwarding multicast packets in a network comprising a plurality of routers in a multicast group. The method includes reporting routing tree information from each of the plurality of routers to other routers of the plurality of routers, receiving a multicast packet

at a second router from a first router, the multicast packet comprising control information, wherein a multicast packet is from a selected source and for a selected multicast group, and determining, based at least in part on the control information and the routing tree information reported by the first router, if the multicast packet is to be forwarded by the second router. The routing tree information includes a source tree for a unicast routing protocol. In response to a positive determination that the multicast packet is to be forwarded, the method forwards the multicast packet from the second router to at least a third router, creates an entry in a multicast forwarding cache, wherein the entry indicates that a multicast packet from the selected source and the selected multicast group is to be forwarded from the second router, and maintains by the second router a multicast packet-forwarding cache. The multicast packet-forwarding cache comprises an entry indicating each multicast packet recently forwarded by the second router. The determining includes determining whether said first router is a next hop in a shortest path from said second router to the source of the multicast packet according to said source tree.

Independent claim 34, upon which claims 35-37 are dependent, recites an apparatus including a plurality of routers in a multicast group configured to forward multicast packets in a network. Each of the plurality of routers reports control information including routing tree information to other routers of the plurality of routers. The routing tree information includes a source tree for a unicast routing protocol. The apparatus also includes a first router, a second router, and a third router. The first router

includes a multicast forwarding cache and is configured to receive a multicast packet from the second router in the network. The multicast packet is from a selected source and for a selected multicast group. The first router is configured to determine, based at least in part, on the control information and the routing tree information reported by the second router to the first router, if the multicast packet is to be forwarded by the first router and to determine whether said first router is a next hop in a shortest path from said second router to the source of the multicast packet according to said source tree.

The first router, in response to a positive determination that the multicast packet is to be forwarded, is configured to forward the multicast packet to at least the third router. The first router is configured to create an entry indicating that a multicast packet from the selected source and the selected multicast group are to be forwarded after making a positive determination that the multicast packet is to be forwarded. The first router comprises a multicast packet-forwarding cache. The multicast packets forwarding cache comprises an entry indicating each multicast packet recently forwarded by the first router.

As will be discussed below, Francis and Li fail to disclose or suggest the elements of any of the presently pending claims.

Francis generally describes a method for routing multicast packets in a network. All nodes according to Francis maintain a state indicating whether or not they are on a particular multicast tree of each multicast group. See column 7, lines 48-62. Thus, initially, a node r107 is the only node with a state indicating that it is on the multicast tree associated with the aforementioned particular multicast group. As nodes join the

multicast group, branches are formed leading from a node currently on the multicast tree to each node joining the group. In addition, in Francis, in response to detecting a request by a source node s101 to join a particular multicast group, the router r101 generates a join request control packet containing the multicast address of the node r107 in the destination address field of the packet and a join request message. See column 8, lines 1-13. A unicast table is consulted to determine a next node. See column 8, lines 19-23. The node r101 then writes the address of previous node, the node s101, and the next node, r102, in a forwarding table and then transmits the join request control packet to the next node r102.

Li generally describes a method of processing a multicast packet that includes determining whether a first forwarding cache that stores forwarding information for ranges of addresses includes a cache entry covering the source address, and, if the first forwarding cache includes the such an entry, adding an entry to a second forwarding cache for the specific source address and group of the packet using the forwarding information associated with the first cache entry.

However, Francis and Li, individually or combined, are silent as to teaching or suggesting that the join request is a source tree for a unicast routing protocol, as the Office Action alleges that the join request is the same as the routing tree information of independent claim 14. Also, Francis and Li fail to teach or suggest that a determination is made “whether said first router is a next hop in a shortest path from said second router to

the source of the multicast packet according to said source tree,” as recited in independent claim 14 and independent claim 34.

Accordingly, Applicants respectfully request that independent claims 14 and 34 and related dependent claims be allowed.

In the Office Action, at page 3, claims 17 and 37 were rejected under 35 U.S.C. § 103 as being unpatentable over U. S. Patent No. 5,331,637 to Francis et al. (“Francis”) in view of U. S. Patent No. 6,778,532 to Akahane et al. (“Akahane”). It is respectfully asserted that, for at least the reasons provided herein below, Francis and Akahane fail to teach or suggest the recitations of the pending claims. Reconsideration is requested.

Dependent claim 17 depends from independent claim 14 and dependent claim 37 depends from independent claim 34. Thus, a combination of Francis and Akahane must teach all the recitations of independent claims 14 and 34.

Akahane generally describes a method for speeding up a multicast packet route search process during the relay process for a multicast packet. See column 5, lines 20-23. A route address is formed by coupling a receiver address and a sender address. See column 5, lines 50-67. In this manner, a search process can be completed by tracing nodes (the number of bits of a search key divided by p) times at a maximum, independently from the number of entries.

Therefore, Akahane focuses in improving the searching speed in a multicast route, but does not teach or suggest the determination features recited in independent claim 14

of being based on at least control information and routing tree information and that the determination “comprises determining whether said first router is a next hop in a shortest path from said second router to the source of the multicast packet according to said source tree,” as recited in independent claims 14 and 34. Accordingly, Applicants respectfully request that independent claims 14 and 34 and related dependent claims be allowed.

CONCLUSION:


In view of the above, Applicant respectfully submits that the claimed invention recites subject matter which is neither disclosed nor suggested in the cited prior art. Applicant further submits that the subject matter is more than sufficient to render the claimed invention unobvious to a person of skill in the art. Applicant therefore respectfully requests that each of claims 14-17 and 34-37 be found allowable and, along with allowed claims 1-3, 6-17, 20-23, 26-37, and 40, this application passed to issue.

If for any reason the Examiner determines that the application is not now in condition for allowance, it is respectfully requested that the Examiner contact, by telephone, the applicant's undersigned attorney at the indicated telephone number to arrange for an interview to expedite the disposition of this application.

In the event this paper is not being timely filed, the Applicant respectfully petitions for an appropriate extension of time.

Any fees for such an extension together with any additional fees may be charged to Counsel's Deposit Account 50-2222.

Respectfully submitted,



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